



Clarifying the new interpretations of the concept of sustainable building

Umberto Berardi*

Worcester Polytechnic Institute, CEE, 100 Institute Road, Worcester, 01609, United States

ARTICLE INFO

Keywords:

Sustainable development
Green building
Sustainable building

ABSTRACT

A review of definitions of sustainable building shows that the terminology needs clarification as many difficulties exist in identifying sustainability in the built environment. The study starts by examining the recent evolution of the concept of sustainable development. Latest interpretations of this terminology are considered, before analysing what sustainability means in the built environment. This paper focuses on constraints which prevent a simple definition and identification of what is a sustainable building. Systems for sustainability assessments are often insufficient to recognize sustainability of buildings given the strong environmental and technological approach of these systems. In particular, the dependence of the concept of sustainability on time, scale, domain and social uncertainties is discussed. Some requirements for a better definition of a sustainable building are indicated. This paper shows that a greater attention should be given to social and economic aspects. The importance of the cross-scale relationships between a building and its surroundings, together with the ever changing flows between them, limits the possibility to define the sustainability at the level of single building, and it encourages looking at larger and crossing scales. Finally, this paper shows that a building is sustainable if it contributes to the sustainability through its metabolism and by doing this it favours a regenerative resilience of the built environment among all the domains of sustainability.

© 2013 Elsevier B.V. All rights reserved.

1. Introduction

This paper was born from the difficulty defining sustainability in the built environment and hence, identifying sustainable buildings. Despite the absence of a largely shared definition, the use of the terminology “sustainable building” is rapidly increasing. In the literature, few definitions of sustainable building have been proposed, meanwhile, journals and books use this term daily. Unfortunately, the available definitions seem incomplete and often prove to be useless because they are unclear and biased (Cole, 2004; Fowke & Prasad, 1996). This paper discusses sustainability across the built environment in order to help clarify the new interpretations of the concept of sustainable building.

A good starting point for this study is the concept of sustainable development. Although it is an often abused term and many definitions have been given of it in the last three decades, it is not difficult to recognize that the concept of sustainable development needs clarification (Basiago, 1995; Martens, 2006). This paper briefly recalls the ongoing discussion about the practical and new meanings of sustainable development. Several papers have recently discussed what is sustainable (Martens, 2006), what sustainable development means (Huetting & Reijnders, 2004) and how it can be

operationalized and identified (Hopwood, Mellor, & O'Brien, 2005). Through this paper, the author hopes to bring the ongoing debate about sustainable development into the building sector in order to help to reconceptualise what a sustainable building is.

The building sector is receiving increasing attention in world-wide policies for sustainable development (UNEP-SBCI, 2009). This attention to the building sector arises from its energy consumption and GHG emissions which, in developed countries, represent 30 and 40% of the total quantities respectively (IPCC, 2007; UNEP-SBCI, 2009). Eurostat (2011) has recently shown that the consumption in the household sector is larger than the consumption in the transport or industrial sector. Moreover, the data of the Energy Information Administration show that the energy consumption and GHG emissions in buildings are increasing at a higher rate than in the other sectors (Akashi & Hanaoka, 2012; EIA, 2012). According to the IPCC (2007), GHG emissions from buildings may increase up to 15.6 GtCO₂-eq/y in 2030, whereas the building sector alone could save almost 6 Gt CO₂-eq/y. The increasing relevance of the building sector in undeveloped and developing countries justifies greater attention towards sustainable buildings too. In fact, in these countries, the building sector is showing high growth rates: as a matter of fact, by 2015 more than half of the building stock of China will have been constructed during the previous 15 years (UNEP, 2003).

The previous data demonstrate the importance that sustainable buildings could have for sustainable development (Sev, 2009), and

* Tel.: +1 508 831 6545; fax: +1 508 831 6545.
E-mail address: uberardi@wpi.edu

hence, they justify the necessity for ways to identify sustainable buildings (Parr & Zaretsky, 2010).

This paper is structured in six sections: Section 2 reviews recent interpretations of the concept of sustainable development, Section 3 discusses the role that sustainable buildings can have in the context of sustainable development, whereas Section 4 discusses the factors of uncertainty for the defining of a sustainable building. Section 5 proposes identifiable characteristics for a sustainable building and, finally, Section 6 summarizes the findings of this work.

2. Recent interpretations of sustainable development

Sustainable development is not a single and well defined concept worldwide. At least one hundred definitions have been given (Hopwood et al., 2005). New meanings are continually added to this term, clouding its concept in a way that every time a definition has been formulated, it has always been incomplete as some of the possible meanings of sustainable development were left out (Robinson, 2004).

The concept of sustainable development goes back to the 1970s. Its theoretical framework evolved after the publication “The Limits to Growth” by the Club of Rome (Meadows, Randers, & Meadows, 1972). The UN Conference on the Human Environment, in the same year, was the first major international gathering to discuss sustainability on a global scale. It created considerable momentum and a series of recommendations which later led to the establishment of the United Nations Environment Programme (UNEP). A few years later, the UNEP Symposium discussed the meaning of sustainable development and stressed the importance of considering future generations and long term perspective (Cocoyoc Declaration, 1974). However, the most famous definition was given in 1987 by the Brundtland Commission (WCED, 1987) which stated that “sustainable development is development which meets the needs of the present without compromising the ability of future generations to meet their own needs”. Although the Brundtland definition of sustainability has received many different interpretations, especially in recent years (Basiago, 1995; Steurer & Hametner, in press; Yanarella & Bartilow, 2000), a resistance to determining an “official” definition has emerged (Fowke & Prasad, 1996; Martens, 2006). Paradoxically, sustainability and sustainable development have also been recognized to suffer from definitional ambiguity by the United Nations, but the diversity of definitions has often been represented as a point of strength of these concepts (IPCC, 2007).

Looking at the common denominator of the definitions of sustainable development, Grosskurth and Rotmans (2005) identified some peculiarities and uncertainties: it is time dependent, it includes several levels of space (and scale), multiple dimensions and it has social dependencies.

The time dependence, already presented in the intergenerational approach of the Brundtland definition, requires us to consider a long term perspective. This raises the question of how far into the future. In fact, the farther in time we go, the more uncertainty emerges (Kemp & Martens, 2007). Bagheri and Hjorth (2007) suggest adopting a dynamic approach which considers transformable processes towards sustainability as it cannot be a fixed goal, but it evolves continually. In this sense, sustainability requires an adaptive flexibility according to the available knowledge at any given time (Kemp, Parto, & Gibson, 2005; Walker & Salt, 2006).

The second aspect of the concept of sustainability regards spatial dependence. Brand and Karvonen (2007) argue that sustainability is locally specific, and more a matter of local interpretation than a universal goal. The local perspective opens the discussion about the possible boundaries of the system which has to be sustainable,

because the interconnections of systems, people and markets counteract a local approach. In fact it is evident that the impact of every action spans from a local scale up to a global one, so that sustainability requires continuous evaluation at several scale levels (Daly, 1996).

The third aspect of sustainability regards the domains in which it can be divided. The concept of sustainability has been categorized in the environmental, social and economic dimensions (WCED, 1987). However, increasing pressure towards an explicit recognition of the cultural and political dimensions has recently been recorded (Hopwood et al., 2005; Vallance, Perkins, & Dixon, 2011). Despite the practical scope, the conceptualization in different dimensions has fragmented the concept of sustainability leading to several misunderstandings (Williams & Millington, 2004; Yanarella & Bartilow, 2000). This division has also been criticized because sustainability has often been considered and evaluated exclusively according to the environmental dimension (Huetting & Reijnders, 2004), leaving out several aspects of sustainability (Hugé, Waas, Dahdouh-Guebas, Koedam, & Block, 2012). In fact, the eco-centred approach has been criticized for being elitist and insufficiently democratic. Roe (1998) condemned it as a version of managerialism that perpetuates a technocratic control which is antisocial because it tries to consider sustainable development as a scientific blueprint the contents of which can be determined by environmental scientists alone. On the contrary, what sustainable development means is more often a decision between several possibilities which also involves non-environmental aspects (Hajer, 1995; van Zeijl-Rozema, Cörvers, Kemp, & Martens, 2008). The 2002 World Summit on Sustainable Development in Johannesburg gave a shift in the perception of sustainable development towards a more comprehensive consideration of social and economic dimensions of development. This change was driven by the emerging needs of the developing countries and was strongly influenced by the discussion to reach the Millennium Development Goals. However, a too optimistic view has recently interpreted economic growth as a possible solution to sustainability goals being confident that innovations and technologies will be able to generate a more sustainable world (Hopwood et al., 2005). The limits of this approach have recently increased the attention towards the social sustainability (Vallance et al., 2011). Finally, Martens (2006) refused the division into domains affirming that sustainable development lies precisely in the interrelations between dimensions.

The fourth peculiarity of sustainability regards the multiple interpretations of the concept by different people. In fact, the necessity of considering different points of view requires acceptance of uncertainty and differences. Sustainable development has shown the need for a pluralistic approach which has to take into account multiple actors. This is the only way to create a common vision of sustainable development, minimizing trade-offs and the different perceptions of the stakeholders. According to this, many governments have recently started measuring sustainability mainly through the quality of life and the well-being of citizens (DEFRA, 2011). McCool and Stankey (2004) stress that sustainability is socially related, and any definition needs to be cultural. In this sense, the participation of the people and their different expectations and interpretations of sustainable development are unavoidable (Albino & Berardi, 2012).

As evident from previous discussions, many definitions of sustainability are possible. In the past, it was considered an objective and clear concept based on scientific evidence and consensus, whereas recently, it has more often been reinterpreted as relative, socially rooted and contextually dependent (Martens, 2006; Yanarella & Bartilow, 2000). The process of revision of the meaning of sustainability has recently led to systemize the concept of sustainability science (Kates et al., 2001), to overcome the Galilean and technocratic view of the world and to accept

متن کامل مقاله

دریافت فوری ←

ISIArticles

مرجع مقالات تخصصی ایران

- ✓ امکان دانلود نسخه تمام متن مقالات انگلیسی
- ✓ امکان دانلود نسخه ترجمه شده مقالات
- ✓ پذیرش سفارش ترجمه تخصصی
- ✓ امکان جستجو در آرشیو جامعی از صدها موضوع و هزاران مقاله
- ✓ امکان دانلود رایگان ۲ صفحه اول هر مقاله
- ✓ امکان پرداخت اینترنتی با کلیه کارت های عضو شتاب
- ✓ دانلود فوری مقاله پس از پرداخت آنلاین
- ✓ پشتیبانی کامل خرید با بهره مندی از سیستم هوشمند رهگیری سفارشات